

## CLAIMS

1. A water-soluble polymer, which has a calcium-ion-binding ability of not less than 470 mgCaCO<sub>3</sub>/g and further has a clay dispersibility of not less than 0.90 in  
5 a test liquid having a calcium concentration of 50 ppm in terms of calcium carbonate.

2. A water-soluble polymer, which has a calcium-ion-binding ability of not less than 430 mgCaCO<sub>3</sub>/g and further has a clay dispersibility of not less than 0.70 in  
10 a test liquid having a calcium concentration of 100 ppm in terms of calcium carbonate.

3. A water-soluble polymer according to claim 1 or 2, which has a weight-average molecular weight of 50,000-8,000.

15 4. A water-soluble polymer according to any one of claims 1 to 3, which is a water-soluble polycarboxylic polymer containing, as an essential structural unit or essential structural units, a structural unit (M) derived from a monoethylenically unsaturated monocarboxylic acid (salt) monomer and/or a structural unit (D) derived from a monoethylenically unsaturated dicarboxylic acid (salt) monomer.

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5. A water-soluble polymer according to claim 4, which has both the structural units (M) and (D), wherein the total content of these two structural units is not lower than 90 weight %, and wherein the mutual molar ratio between them (D/M) is in the range of 35/65 to 65/35.

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6. A water-soluble polymer according to claim 5, wherein the molar ratio (D/M) is in the range of 40/60 to 60/40.

7. A process for production of a water-soluble polymer, which is a process comprising the step of polymerizing a monomer component to thereby obtain the water-soluble polymer, wherein the monomer component essentially includes a monoethylenically unsaturated monocarboxylic acid (salt) monomer (m) and/or a  
5 monoethylenically unsaturated dicarboxylic acid (salt) monomer (d);  
with the process being characterized in that:

the polymerization is carried out with at least two polymerization initiators essentially including hydrogen peroxide, and the reaction temperature in this polymerization is set in the range of 99-80 °C.

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8. A process for production of a water-soluble polymer, which is a process comprising the step of polymerizing a monomer component to thereby obtain the water-soluble polymer, wherein the monomer component essentially includes a monoethylenically unsaturated monocarboxylic acid (salt) monomer (m) and/or a  
15 monoethylenically unsaturated dicarboxylic acid (salt) monomer (d);  
with the process being characterized in that:

the molar ratio between the monomers (m) and (d) (d/m) is in the range of 35/65 to 65/35;

the polymerization is carried out with at least two polymerization initiators  
20 essentially including hydrogen peroxide, and the monomer (d) charged before addition of the polymerization initiators has a neutralization degree of 70 to 95 mol %; and

the weight ratio between hydrogen peroxide and the other initiators (hydrogen peroxide/other initiators) in the polymerization initiators in the polymerization is set  
25 at not less than 1.80, and/or the rate of the other initiators being added is set at not more than 1.40 g/mol·h.

9. A process for production of a water-soluble polymer, which is a process

comprising the step of polymerizing a monomer component to thereby obtain the water-soluble polymer, wherein the monomer component essentially includes a monoethylenically unsaturated monocarboxylic acid (salt) monomer (m) and/or a monoethylenically unsaturated dicarboxylic acid (salt) monomer (d);

5 with the process being characterized in that:

the molar ratio between the monomers (m) and (d) (d/m) is in the range of 35/65 to 65/35;

the polymerization is carried out with at least two polymerization initiators essentially including hydrogen peroxide, and the monomer (d) charged before  
10 addition of the polymerization initiators has a neutralization degree of not less than 90 mol %; and

the weight ratio between hydrogen peroxide and the other initiators (hydrogen peroxide/other initiators) in the polymerization initiators in the polymerization is set in the range of 0.4 to 1.1.

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10. A detergent composition, which comprises, as an essential component, the water-soluble polymer as recited in any one of claims 1 to 6.

11. A dispersant, which comprises, as an essential component, the  
20 water-soluble polymer as recited in any one of claims 1 to 6.

12. A water-treating agent, which comprises, as an essential component, the water-soluble polymer as recited in any one of claims 1 to 6.